

# Technology Opportunity

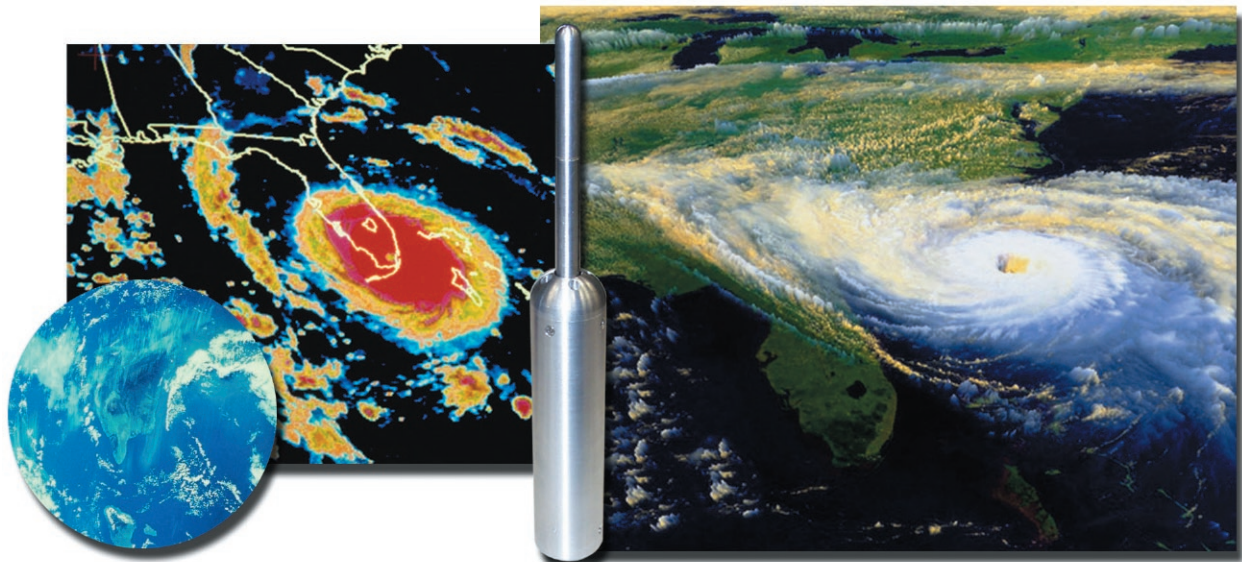
## Sensors – Physical

### High-Velocity Wind Sensor

The National Aeronautics and Space Administration (NASA) seeks to license its High-Velocity Wind Sensor technology to private industry for use in commercial applications. Designed at the John F. Kennedy Space Center (KSC), Florida, the High-Velocity Wind Sensor was developed to meet the need for accurate high-speed wind information, enabling engineering assessment and recertification of KSC facilities, ground support equipment, and flight hardware in cases of hurricanes, tornados, or waterspout strikes.

Recent studies of super storms have indicated wind speeds in category-5 hurricanes can exceed 200 miles per hour (mph), while those from F-5 tornados can reach speeds in excess of 300 mph. Current wind measurement technologies often fail under these extreme conditions.

This new sensor technology is designed to function at a much higher wind velocity than conventional anemometers. Its stand-alone design, offering no moving parts, replaces older sensors that are often hindered in performing at extremely high wind speeds because of their mass, aerodynamic drag, rotating mechanisms, or sensitivity to other environmental factors such as water or acoustic noise.




#### Potential Commercial Uses

- Manufacturers of meteorological equipment
- Governmental meteorological observation and research agencies, including the National Oceanic and Atmospheric Administration (NOAA), the National Weather Service (NWS), and the Department of Defense (DOD)
- Government emergency response agencies including Federal Emergency Management Agency (FEMA)
- Public and private airports and spaceports
- News media weather forecasters
- Meteorological hobbyists

#### Benefits

- Is able to measure wind velocity at much higher wind speeds than current technology.
- Offers an innovative strain gage platform design that allows the measurement of bending forces only, thereby providing a decoupling of the two orthogonal components of wind pressure to derive accurate estimates of each (north and east) component.
- Drag force measurement affords improved response as the wind speed increases.



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- Can operate in a stand-alone fashion for a typical storm duration and provide useful data sets.
  - Provides an extremely rugged, low-profile design, capable of high-wind measurement without moving parts or open ports and easily designed for lightning immunity and other environmental effects.

## The Technology

The KSC High-Velocity Wind Sensor employs aerodynamic drag force to infer wind speed. Strain gages mounted orthogonally at the base of a low-profile, rigidly mounted cylindrical rod are used to measure the aerodynamic force, which is proportional to the square of wind speed. As the wind speed increases, the strain gage signals increase by the square of the wind speed, thereby affording the best performance at the highest wind speeds.

An alternate measurement of scalar wind speed is possible by observing the frequency of the vortices shed off the cylindrical surface. The vortex-shedding frequency is linearly proportional to wind speed, yielding an independent measure of wind speed from the same set of gages.

The instrument includes the cylindrical rod outfitted with strain gages, a weather-resistant housing, signal processing electronics, and data storage capabilities.

## Options for Commercialization

NASA seeks qualified companies to commercialize the High-Velocity Wind Sensor. This and other technologies are made available by the KSC Technology Commercialization Office through a variety of licensing and partnering agreements. These include patent and copyright licenses, cooperative agreements, and reimbursable and nonreimbursable Space Act Agreements.

## Contact

If your company is interested in the High-Velocity Wind Sensor technology or if you desire additional information, please reference Case Number KSC-11886 and contact:

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## Commercialization Checklist

- ✓ Patent pending
  - U.S. Patent
  - Copyrighted
- ✓ Available for licensing
  - Available for no-cost transfer
  - Seeking industry partner for further codevelopment

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